

CORRES. CONTROL  
OUTGOING LTR NO.

# EG&G ROCKY FLATS

EG&G ROCKY FLATS, INC.  
ROCKY FLATS PLANT, P.O. BOX 464, GOLDEN, COLORADO 80402-0464 • (303) 966-7000

DOE ORDER#  
94RF01684

February 9, 1994

94-RF-01684

DIST.	LTR	ENC
AMARAL, M.E.		
BENEDETTI, R.L.		
BENJAMIN, A.		
BERMAN, H.S.		
BRANCH, D.B.		
CARNIVAL, G.J.		
COPP, R.D.		
DAVIS, J.G.		
FERRERA, D.W.		
HANNI, B.J.		
HARMAN, L.K.		
HEALY, T.J.		
HEDAHL, T.		
HILBIG, J.G.		
HUTCHINS, N.M.		
KIRBY, W.A.		
KUESTER, A.W.		
MAHAFFEY, J.W.		
MANN, H.P.	X	
MARX, G.E.		
McDONALD, M.M.		
McKENNA, F.G.		
MONTROSE, J.K.		
MORGAN, R.V.		
POTTER, G.L.		
PIZZUTO, V.M.		
RISING, T.L.		
SANGLIN, N.B.		
SETLOCK, G.H.		
STEWART, D.L.		
SULLIVAN, M.T.		
SWANSON, E.R.		
WILKINSON, R.B.	X	
WILLIAMS, S.(ORC)		
WILSON, J.M.		
WYANT, R.D.		



V. F. Witherill  
Acting Director for Decontamination  
and Decommissioning Planning Division  
DOE, RFO

RESOURCE CONSERVATION RECOVERY ACT (RCRA) UNIT 21 AND 48 CLOSURE PLAN -  
SGS-099-94

Attached for your review and comment is a draft RCRA Closure Plan for Units 21 and 48. Within one week of receipt of this plan a round table review will be scheduled at which your comments will be received. An advanced copy of the plan should be forwarded to the Colorado Department of Health (CDH) and the Environmental Protection Agency (EPA) for their information. Any informal comments received from CDH and EPA will be considered for incorporation into the next revision of the closure plan.

Should you have any questions, please contact T. R. DeMass at extension 8760 or myself at extension 8540.

*S. G. Stiger*  
S. G. Stiger  
Associate General Manager  
Environmental Restoration Management

TRD:crw

Orig. and 1 cc - V. F. Witherill

Attachment:  
As Stated

cc:  
M. H. McBride - DOE, RFO  
A. H. Pauole - " "  
R. J. Schassburger - " "  
M. N. Silverman - " "

CORRES. CONTROL	X	X
ADMN RECORD/0809	X	X
PATS/T130G		
TRAFFIC		

CLASSIFICATION:

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER  
SIGNATURE

DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
DATE CLASSIFICATION OFFICE

IN REPLY TO RFP CC NO:  
N/A

ACTION ITEM STATUS

PARTIAL/OPEN  
 CLOSED

LTR APPROVALS:

ORIG & TYPIST INITIALS  
TRD:crw

1/54  
FF-46469 (Rev. 9/93)



ADMIN RECORD

IA-A-001280

DRAFT  
RCRA UNITS 21 AND 48 CLOSURE PLAN

EPA I.D. No. CO 7890010526

U.S. Department of Energy - Rocky Flats Plant

February 4, 1994

REVIEWED FOR CLASSIFICATION/UCR  
By [Signature]  
Date 2-14-94

2

# CLOSURE PLANS FOR INTERIM STATUS UNITS

## TABLE OF CONTENTS

A. CLOSURE OVERVIEW .....	1
1. Introduction .....	1
2. Facility Contact .....	1
3. Facility Closure Notification and Certification .....	2
4. Regulatory Requirements .....	2
5. Closure Performance Standard .....	2
6. Sampling and Analysis .....	9
7. Closure Schedules .....	10
8. Order of Unit Closure .....	12
9. General Closure Activities .....	12
10. Soil Sampling .....	17
11. Criteria for Determining Post-Closure Care .....	19
12. Recordkeeping .....	19
13. Amendment of Plan .....	19
B. CONTAINER STORAGE AREAS - STANDARD CLOSURE ACTIVITIES .....	21
c. Buildings .....	21
C. CONTAINER STORAGE AREAS - UNIT-SPECIFIC CLOSURE INFORMATION ..	23
D. TANK SYSTEMS - STANDARD CLOSURE ACTIVITIES .....	26
E. TANK SYSTEMS - UNIT-SPECIFIC CLOSURE INFORMATION .....	30
F. MISCELLANEOUS TREATMENT UNITS - STANDARD CLOSURE ACTIVITIES .	33
G. MISCELLANEOUS TREATMENT UNITS - UNIT-SPECIFIC CLOSURE INFORMATION .....	34

3

## LIST OF TABLES

Table 1A	Indicator Parameter Decontamination Standards . . . . .	5
Table 1B	Technology-Based Performance Standards . . . . .	6
Table 2	Container Storage Area Unit-Specific Closure Information . . . . .	28
Table 4	Treatment Unit-Specific Closure Information . . . . .	42

## LIST OF FIGURES

Figure 1	Minimum Closure Time . . . . .	43
Figure 2	Maximum Closure Time . . . . .	44
Figure 3	Closure Options . . . . .	45
Figure 4	Closure Activities - Container Units . . . . .	46
Figure 6	Closure Activities - Tank Systems . . . . .	47
Figure 7	Closure Activities - Treatment Units . . . . .	48

## LIST OF APPENDICES

Appendix A	Decontamination Procedures . . . . .	49
Appendix B	Soil Sampling . . . . .	50

14

## CLOSURE PLANS FOR INTERIM STATUS UNITS

### A. CLOSURE OVERVIEW

#### 1. Introduction

- a. This plan addresses closure of RCRA Units 21 and 48 at Rocky Flats Plant. Section A contains an overview of closure activities. Sections B and C contain descriptions of the closure activities for container storage areas. Sections D and E contain descriptions of the closure activities for tank systems. Sections F and G contain descriptions of closure activities for miscellaneous treatment units.
- b. The Rocky Flats Plant shall perform closure activities, including waste removal and decontamination (if necessary), on the units identified in this plan. The Plant shall follow decontamination procedures detailed in Appendix A for interim status units, secondary containment structures, and ancillary equipment. The Plant shall verify that the unit undergoing closure has been decontaminated to meet the closure performance standard, as defined in (A)(5) of this plan, or has been removed for proper treatment and/or disposal.
- c. A unit and its ancillary equipment will normally be decontaminated. However, the Rocky Flats Plant may opt to properly dispose of the unit without decontamination based on waste minimization, detoxification, and human exposure concerns. If the equipment is discarded, a hazardous waste determination will be made at the time of waste generation using either analysis or process knowledge. Equipment which does not contact the waste and does not serve as secondary containment does not require sampling as part of closure. Examples of such equipment include pallets, drum racks, pipe supports etc.
- d. Where the building is used for secondary containment for a unit, decontamination of that portion used for secondary containment should be completed at the same time as closure of the unit unless otherwise specified in the unit-specific closure information.

#### 2. Facility Contact

The Rocky Flats Facility contact for closure activities is:

Manager, Rocky Flats Office, at the following mailing address and phone number:

5

U.S. Department of Energy  
Rocky Flats Office  
P.O. Box 928  
Golden, Colorado 80402-0928  
Phone: (303) 966-2025

3. Facility Closure Notification and Certification

The closure of Units 21 and 48 will be conducted as Partial Closure of the Facility. The Director will be notified of the intent to close each hazardous and mixed waste unit prior to the initiation of closure activities. Certification of closure of individual units may be submitted prior to final closure of the facility.

4. Regulatory Requirements

- a. A closure plan for closure of the hazardous and mixed waste treatment and storage units at the Rocky Flats Plant is required pursuant to 6 CCR 1007-3, Part 265 of the Colorado Hazardous Waste Regulations. The purpose of this plan is to provide for closure of the interim status hazardous and mixed waste units at the Rocky Flats Facility. This plan addresses the following Colorado Hazardous Waste Regulations: Part 265, Subpart G - Closure and Post-Closure, Sections 265.110 through 265.120; Subpart J - Tanks, Section 265.197; and Subpart Q - Chemical, Physical and Biological Treatment, Section 265.404.
- b. No demonstration of financial responsibility is required because under current regulations compliance with Part 266 Subpart A - Financial Requirements is not required for government-owned facilities.
- c. A post-closure plan under the Colorado RCRA regulations is not required for operating interim status storage facilities (only for land treatment or disposal facilities). However, a contingent post-closure plan is required for certain tank systems that do not have adequate secondary containment under Section 265.197(c) of the Colorado Hazardous Waste Regulations.
- d. Hazardous debris may be treated using one of EPA's established technology-based treatment standards defined in 40 CFR Section 268.45.

5. Closure Performance Standard

- a. This closure plan provides for closure of the hazardous and mixed waste units in a manner that minimizes the need for further maintenance and controls; minimizes or eliminates threats to human health and the environment; and minimizes or eliminates the post-closure escape of hazardous waste, hazardous waste constituents, leachate,

6

contaminated rainfall or waste decomposition products to the ground or surface waters or to the atmosphere. There are two alternatives provided in this section for closure performance standards: (1) concentrations of specific analytes in rinse, smear, or direct samples are established at which the goals of closure are achieved; and (2) applicable Best Demonstrated Available Technology (BDAT) extraction or destruction technologies are identified that can be used to demonstrate compliance with the closure goals.

- b. Initial sampling may be performed at the beginning of closure to determine if the unit needs to be decontaminated to meet the closure performance standard. If the unit meets the closure performance standard, as indicated by the results of initial sampling, the unit will be certified closed.
- (1) To determine if the closure performance standard has been met for materials, equipment and secondary containment, the following sampling methods will be used:
- smear sampling (for the purposes of this closure plan, smear sampling consists of gently rubbing a small piece of clean filter paper or cloth over an area of approximately 100 square centimeters and then analyzing the smear material for hazardous constituents), or
  - rinsate sampling from rinsing a representative portion of the material, equipment, or secondary containment, or
  - direct sampling of the material, equipment, or secondary containment.
- (2) The selection of the specific sampling method will be determined when closure activities for a particular unit begin. The choice of sampling method will be appropriate for the history and conditions of the unit and the type of decontamination that may be implemented at the unit.
- c. Indicator parameters are listed in Table 1A, with specific numerical closure performance standards. This list is not intended to be exhaustive, but rather representative of a variety of metals and organic compounds widely used at RFP. Selection of the parameters from Table 1A for which samples will be analyzed for each unit will be based on the specific wastes stored at that unit. These wastes are specified in Sections C, E, G, and H of this plan.
- d. There are two alternative closure performance standards for materials, equipment, and secondary containment. The first alternative, the Analytical-Based Performance Standard, involves sampling, analysis, and comparison of results to the approved

standards. The second alternative, the Technology-Based Performance Standard, requires that approved decontamination technologies be implemented.

(1) Analytical-Based Performance Standard

A unit will be considered clean-closed if the analytical results (1) do not exhibit the characteristic of ignitability, corrosivity, or reactivity as defined in 6 CCR 1007-3, Section 261.22, and (2) do not exceed concentrations of the selected indicator parameters presented in Table 1A. Table 1A concentrations for rinsate are equal to 10 times the national primary drinking water standard. Concentrations for smear samples are set at non-detectable, because smears will primarily be used as an initial screening tool to detect the presence of contamination. Concentrations for direct samples are set at the TCLP limit (or for non-TCLP compounds, at 100 times the drinking water standard), which is equivalent to the generator making a hazardous waste determination when removing equipment or structures. Direct samples will be analyzed using a TCLP extract.

(2) Technology-Based Performance Standard

Tanks, equipment, and portions of concrete secondary containment areas that are removed during closure meet the definition of hazardous debris, and as such, must comply with the debris rule BDAT as specified in 40 CFR Section 268.45 prior to off site disposal. The same technologies for decontaminating debris can also be applied to closure of equipment left in place as an alternative closure performance standard. The BDAT technologies from 40 CFR Section 268.45, Table 1, that are considered appropriate for closure of units at RFP are presented in Table 1B.

If an approved BDAT is used, and the remaining material is not characteristic hazardous waste, the treated material, structures, and equipment (which may be left in place for reuse after closure) will be considered clean closed without verification sampling.

**TABLE 1A  
INDICATOR PARAMETER  
DECONTAMINATION STANDARDS<sup>a</sup>**

Constituent	Standard (mg/l)		
	Rinse Water	Smear	Direct <sup>b</sup>
Benzene	0.05	ND <sup>c</sup>	0.5
Carbon tetrachloride	0.05	ND <sup>c</sup>	0.5
Cyanide	2.0	ND <sup>c</sup>	20
Ethyl benzene	7.0	ND <sup>c</sup>	70
Methylene chloride	0.047	ND <sup>c</sup>	0.47
Tetrachloroethylene	0.05	ND <sup>c</sup>	0.7
Toluene	10	ND <sup>c</sup>	100
Trichloroethylene	0.05	ND <sup>c</sup>	0.5
1,1,1-Trichloroethane	2.0	ND <sup>c</sup>	20
Xylene	100	ND <sup>c</sup>	1,000
Beryllium	0.04	ND <sup>c</sup>	0.4
Cadmium	0.10	ND <sup>c</sup>	1.0
Chromium	0.5	ND <sup>c</sup>	5.0
Lead	0.5	ND <sup>c</sup>	5.0
Mercury	0.02	ND <sup>c</sup>	0.2
Nickel	1.0	ND <sup>c</sup>	10
Selenium	0.1	ND <sup>c</sup>	1.0
Silver	0.5	ND <sup>c</sup>	5.0

- <sup>a</sup> Any appropriate technology from 40 CFR 268.45, Table 1, may be used in lieu of demonstrating the following numerical standards.
- <sup>b</sup> Analyses will be done on the TCLP extract of the direct sample.
- <sup>c</sup> ND = Non-detectable; mean concentration plus 2 standard deviations of that found on unused smears.

9

**TABLE 1B  
TECHNOLOGY-BASED PERFORMANCE STANDARD**

Technology description	Performance and/or design and operating standard	Contaminant restrictions
<p><b>A. Extraction Technologies</b></p> <p><b>1. Physical Extraction</b></p> <p><b>a. Abrasive Blasting:</b> Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads).</p> <p><b>b. Scarification, Grinding, and Planing:</b> Process utilizing striking piston heads, saws, or rotating grinding wheels such that contaminated debris surface layers are removed.</p> <p><b>c. Spalling:</b> Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards.</p> <p><b>d. Vibratory Finishing:</b> Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed.</p> <p><b>e. High Pressure Steam and Water Sprays:</b> Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.</p> <p><b>2. Chemical Extraction</b></p> <p><b>a. Water Washing and Spraying:</b> Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers.</p>	<p><i>Glass, Metal, Plastic, Rubber:</i> Treatment to a clean debris surface.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Removal of at least 0.6 cm of the surface layer; treatment to a clean debris surface.</p> <p>Same as above . . . . .</p> <p><i>All Debris:</i> Treatment to a clean debris surface.</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit, except that this thickness limit may be waived under an "Equivalent Technology" approval under 268.42(b); debris surfaces must be in contact with water solution for at least 15 minutes.</p>	<p><i>All Debris: None</i></p> <p>Same as above</p> <p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Contaminant must be soluble or 5% by weight in emulsion; if debris is contaminated with a dioxin-listed waste, an "Equivalent Technology" approval under 268.42(b) must be obtained.</p>

10

Technology description	Performance and/or design and operating standard	Contaminant restrictions
<p>b. <i>Liquid Phase Solvent Extraction:</i> Removal of hazardous contaminants from debris surfaces and surface pores by applying a nonaqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time.</p>	<p>Same as above . . . . .</p>	<p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Same as above, except that contaminant must be soluble to at least 5% by weight in the solvent.</p>
<p><b>B. Destruction Technologies:</b></p> <p>1. <b>Chemical Destruction</b></p> <p>a. <i>Chemical Oxidation:</i> Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents- (1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultra-violet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent destruction efficiency. Chemical oxidation specifically includes what is referred to as alkaline chlorination.</p> <p>b. <i>Chemical Reduction:</i> Chemical reaction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency.</p>	<p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under 268.42(b); treated debris must be separated from treatment residuals using simple physical or mechanical means, and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris. <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (1.2 inch) in one dimension (i.e., thickness limit), except that this thickness limit may be waived under the "Equivalent Technology" approval.</p> <p>Same as above . . . . .</p>	<p><i>All Debris:</i> Metal contaminants</p> <p>Same as above</p>

- e. The closure performance standard for inorganic hazardous constituents, including metals, in soil shall be as follows:
- (1) Mean background soil concentrations plus two standard deviations, or
  - (2) Risk levels of  $1 \times 10^{-6}$ , using a risk analysis procedure approved by the Director for carcinogenic metals, and
  - (3) Hazard Index less than 1.0 for non-carcinogenic metals as defined in CERCLA risk assessment guidance (Superfund Public Health Evaluation Manual, EPA/540/1-86/060), and
  - (4) Does not exhibit any characteristic of a hazardous waste, as defined in 6 CCR 1007-3 Part 261, Subpart C.
- f. The closure performance standard for organic hazardous constituents in soil shall be as follows:
- (1) Mean background soil concentration plus two standard deviations, or
  - (2) Risk-based levels of  $1 \times 10^{-6}$  for carcinogenic organic compounds using a risk analysis procedure approved by the Director, and
  - (3) Hazard Index less than 1.0 for non-carcinogenic organic compounds as defined in CERCLA risk assessment guidance (Superfund Public Health Evaluation Manual, (EPA/540/1-86/060), and
  - (4) Does not exhibit any characteristic of a hazardous waste, as defined in 6 CCR 1007-3 Part 261, Subpart C.
- g. The applicable background soil concentrations are those obtained under the Background Hydrogeochemical Characterization & Monitoring Plan being implemented, or other background soil sampling approved by the Director.
- h. When the closure performance standard is exceeded, the following actions may be undertaken: decontamination or removal of containment system components, decontamination or removal of ancillary equipment, decontamination or removal of soil, removal of hazardous waste and removal of hazardous waste residues to a level that will meet the applicable closure performance standard, or post-closure activities will be implemented through the IAG process.

## 6. Sampling and Analysis

### a. Sampling Methods

Methods used to collect hazardous waste samples at RFP comply with those described in 6 CCR 1007-3, Part 261, Appendix I. Specific methods are selected on the basis of the ease with which representative samples can be collected. Sampling location, sampling matrix, sample container type and size, and accessibility are considered when selecting a sampling method. Waste matrices and appropriate sampling methods will be consistent with the methods listed in Part IV of the Rocky Flats RCRA Permit.

The following sampling methods may be used during closure activities:

- Smear Sampling - for purposes of this closure plan, involves gently rubbing a small piece of clean filter paper or cloth over an area of approximately 100 square centimeters and then analyzing the smear material for hazardous constituents.
- Rinsate Sampling - involves collecting samples of liquids that have contacted a representative portion of the material, equipment, or secondary containment.
- Direct Sampling - involves taking a grab sample of material such as Raschig rings or concrete chips.

Selection of the specific sampling method will be determined when closure activities for a particular unit begin. Sampling methods will be appropriate for the history and conditions of the unit and the type of decontamination that may be implemented. The detailed work packages will identify specific sampling methods to be used during closure activities. For example, direct sampling of a porous material would be selected over smear sampling because smear sampling might provide misleading information if contamination had penetrated the surface. When waste minimization is considered, smear sampling is the preferred method, in appropriate situations, because it generates the least amount of waste.

### b. Analytical Methods

Analytical work will be performed on site at RFP unless other approved laboratories are identified. The analytical test methods for verification of compliance with the closure performance standard will be consistent with the approved methods listed in Part IV of the Rocky Flats RCRA Permit. The detailed work packages will identify specific analytical methods to be used during closure activities.

c. Quality Assurance

All appropriate RFP sampling and analytical quality assurance/quality control procedures will be followed to ensure collection of representative samples and analytical data integrity. At a minimum, five waste samples and five background samples will be collected for each determination of compliance with the closure performance standard. The background samples will be collected from unused materials, equipment, and secondary containment. For analytical results that are below the detection limit, a value of one-half the detection limit will be used in calculations and evaluations for purposes of statistical accuracy. However, the mean concentration for any hazardous constituent will not be less than the detection limit.

7. Closure Schedules

a. Final Closure Schedule

- (1) Because of the large number of hazardous and mixed waste units at the Rocky Flats Plant, all of the units cannot be closed at the same time. Therefore, the closure of most units will be conducted as partial closures of the facility. "Facility" is defined in Section 260.10 of the Colorado Hazardous Waste Regulations as all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. The Rocky Flats Plant shall take necessary precautions (including compliance with all permit conditions) during this time of partial closures to prevent threats to human health and the environment. Final closure of the facility will begin after the last waste from cleanup of the hazardous and mixed waste processes has been generated. Closure of the last remaining unit(s), which will be storing or treating hazardous and mixed waste, will constitute final RCRA closure of the facility in accordance with the schedules presented in Figures 1 and 2.
- (2) Figure 1 describes the schedule for the minimum closure time required for each unit. The minimum time applies to a situation where a unit is believed to be clean, sampled initially, and the results of the sample analysis indicate that the unit meets the closure performance standard and additional decontamination is not necessary. If the results of the initial sampling indicate that the unit does not meet the closure performance standard, then additional decontamination efforts will be undertaken. Figure 2 identifies the schedule for the maximum closure time estimated for this situation. If the total time necessary for closure will exceed 180 days (initial sample results indicate decontamination is necessary), the Rocky Flats Plant will notify the Director within 30 days of knowing that closure will take longer than 180 days (Part 265.113(b)) and at least 30 days prior to the expiration of the 180-day closure period as required in Part 265.113(c).

- (3) Closure of a unit will begin within 90 days of receipt of the final volume of hazardous or mixed waste or within 90 days after approval of the Closure Plan, whichever is later. All waste will be removed from each unit within this 90 day period. If the hazardous or mixed waste inventory takes, of necessity, longer than 90 days to be removed from the unit, the Rocky Flats Plant will notify the Director. Following removal of the final hazardous or mixed waste inventory, the Rocky Flats Plant will begin, if necessary, decontamination and dismantling activities for the unit as described elsewhere in this plan. The sequencing of closure will be carefully planned in the work packages to allow for timely completion of all activities.

b. Unit Closure Schedule (Partial Closure of the Facility)

- (1) Closure of a unit will begin within 90 days of receipt of the final volume of hazardous or mixed waste or within 90 days after approval of the Closure Plan, whichever is later. The schedule for partial closure is the same as that described above in "Final Closure," but may vary based on the number of units being closed and the level of contamination identified.
- (2) Sections C, E, and G identify the minimum and maximum amounts of time that may be required for completion of all closure activities on a unit-by-unit basis. If a number of units are closed at once, the total time required for decontamination activities may not be additive for the various units; a number of preparatory and field activities may proceed concurrently. The information in Sections C, E, and G was prepared assuming that each unit was being closed independent of any other unit. It may be possible to close more than one unit at a time during partial closure activities which would allow for time efficiencies that cannot be fully represented in the tables or this text. For instance, two related units may be closed at approximately the same time.
- (3) Soil sampling and analysis required by this plan for outdoor units will be accomplished within 120 days from the beginning of closure of each outdoor unit. If soil sampling for outdoor units does identify contaminated soil, a request for modification of the closure plan will be submitted within 30 days of identification of the contaminated soil. The closure plan and schedule for closure of the outdoor unit will be amended to address the complete identification and removal of contaminated soil. Similarly, a request for modification of the closure plan will be submitted within 30 days of the identification of any other problem requiring amendment of the closure plan identified during the implementation of partial or final closure.

c. Engineering and Work Control Packages

When the determination is made that decontamination of a unit is required, work will begin on the engineering and work packages that will govern the closure activities. The first step required in preparation of these packages is the commencement of engineering design work for stripout and decontamination/decommissioning activities if necessary for closure of the unit. The engineering package will detail the exact sequence of decontamination activities, as well as exact methods of size reduction, to dismantle and containerize the units undergoing closure. The engineering package, when complete, will be held on file at the Rocky Flats Plant during implementation of closure activities. In addition to the engineering package, a detailed work package (which will include health and safety requirements) will also be developed and held on file during closure.

8. Order of Unit Closure

a. The criteria that will govern the order of unit closure are presented below:

- Prior to implementation of closure of any unit, an evaluation would be made to ensure that all wastes which will be generated as a result of closure activities can still be properly handled. For example, "unit y" cannot be closed prior to "unit x" if closure of "unit x" may generate a waste that can only be handled in "unit y."
- RCRA-regulated units will typically only be closed when the processes and operations that these units are supporting have permanently stopped.
- RCRA tank units will be closed in a manner such that all equipment dedicated to a tank will be closed to the point where that equipment is shared between the closing unit and another non-closing RCRA unit, or between the closing unit and a non-RCRA unit.
- All ancillary equipment dedicated to a unit will be closed with the unit.
- A series of RCRA-regulated tanks will typically be closed in series similar to the flow of materials in the tanks during normal tank operations.

9. General Closure Activities

a. Closure of Hazardous and Mixed Waste Units

- (1) This section contains a description of closure activities for each hazardous and mixed waste unit. The disposition or treatment of wastes is also discussed.

TC

- (2) There are two general types of units at the facility: units which store or treat hazardous waste and units which store or treat mixed waste. Detailed descriptions of each unit covered by this plan are found in Sections C, E, and G.

b. Maximum Waste Inventory

- (1) The maximum inventory capacity of each of the interim status units under normal operating conditions is listed in Sections C, E, and G in the unit specific information sheet. Wastes managed in each unit are also listed in these sections.

c. Closure Personnel

- (1) Closure personnel will be qualified workers, trained in basic mechanical skills, decontamination techniques and safety procedures necessary to accomplish closure. Minimum crews (2 for hazardous and 4 for mixed waste units) are required for health and safety requirements.
- (2) If it is found that decontamination or other closure activities necessarily take longer than expected, additional qualified personnel may be required to ensure implementation of closure within the estimated time schedule.

d. Closure Options

- (1) Many of the units covered by this plan are integrated with other units or operating systems at the Rocky Flats Plant. Figure 3 identifies the closure options developed for these units. The general categories of the closure options are:
  - Partial Closure of the Facility (Closure of a Unit);
  - Partial Closure of a Unit; and
  - Closure of Units Sharing Secondary Containment.
- (2) The following paragraphs describe all possible paths that could lead to the closure of any one of the units in this plan. An evaluation will be made at the time of closure to identify the situation of the unit or units that are to be closed and establish the path from the flow chart that leads to closure. In many cases, the closure option may need to be altered to accommodate future situations, changes in operations, and/or advancements in technology. The closure options are supplemented by the closure activities which are detailed in other sections of this plan.

### Partial Closure of the Facility (Closure of a Unit)

- (1) Closure of a unit involves closing one or more units that are isolated from other units. This is the option that will likely apply to most units in this Plan.
- (2) For the purposes of this plan, the definition of closure of a unit is the end of all hazardous waste management activities at a single unit rather than for the entire facility. Hazardous waste will no longer be present within the closed unit. Activities at other hazardous waste management units within the facility are independent of the status of the unit in question.

### Partial Closure of a Unit

This option is not relevant for Units 21 and 48.

### Closure of Units Sharing Secondary Containment

- (1) In some instances, several individual units share the same secondary containment. If all of the units are to be closed at the same time, closure of a unit as described above will apply. If, however, any one of the units is to be closed independently of the others, the unit to be closed will be addressed as described in this section, but secondary containment will not be addressed.
- (2) As each unit sharing secondary containment is closed, the applicable decontamination procedures for that type of unit described in Sections B., D., F., and G. would be followed except for the decontamination of secondary containment. Decontamination of secondary containment will occur at the time of closure of the last unit sharing secondary containment.
- (3) When closing the last unit sharing secondary containment, the procedures for closure of a unit as described above including the secondary containment in its entirety (e.g., the whole room) will be followed.

### f. Disposition of Waste

- (1) The closure plans are based on the assumption that, as part of closure, each unit will be decontaminated to levels consistent with the applicable closure performance standard specified in A.5.
- (2) The plans also assume that the plant waste management and treatment capabilities will be available to receive the unit inventory and the cleanup waste.

18

- (3) Consistent with the objective of minimizing wastes generated during closure, the following closure plans presume that, where practical, facility equipment will be decontaminated. Where this is not feasible, such materials may be disposed of in compliance with local, State, and Federal regulations and according to standard operational procedures for handling such wastes.
- (4) The disposition of any hazardous or mixed waste from a unit undergoing closure will depend on the exact characteristics of the waste and the permitted treatment and disposal facilities of all commercial and DOE facilities. The disposition of all hazardous and mixed waste will fully comply with all local, State and Federal Hazardous Waste Regulations applicable at the time of disposal.
- (5) The disposition/destination of drummed hazardous waste will be dependent upon the type of waste present in the drum. Treatment of hazardous wastes at the Rocky Flats Plant will always be the preferred waste treatment alternative. If on-site treatment is not feasible, then the disposition of each waste will depend upon the characteristics of each waste and the capabilities of other designated treatment, storage, and disposal facilities. All wastes shall be disposed of properly.
- (6) Liquid wastes that, based on the waste characteristic, are suitable for recycling will be sent to OSCO in Henderson, Colorado, or to another designated recycling facility.
- (7) Solid wastes with levels of PCBs suitable for landfilling or soft wastes contaminated with hazardous organics at concentrations less than the RCRA Land Ban requirements will be sent to the USPCI, Green Mountain, Utah or other approved facility for burial. This same facility can accept heavy metal-contaminated waste or corrosive waste for treatment and burial. Wastes with the cyanide-reactive characteristic, wastes highly contaminated with cyanides, Toxicity Characteristic wastes, and other solvent-free hazardous wastes will go to the USPCI, Oklahoma or other approved facility for treatment or encapsulation and disposal. Hazardous wastes contaminated with levels of PCBs greater than those approved for landfill disposal will be sent to the Rollins Environmental Services facility in Deer Park, Texas or another designated facility for incineration, or other designated facility.
- (8) Mixed radioactive wastes will be disposed of at an approved facility. Low-level mixed waste meeting Land Disposal Restriction requirements is currently designated to be shipped to the Nevada Test Site or another approved facility in the future. If no DOE facilities can accept these wastes, then commercial facilities will be considered. Finally, if no facilities exist for shallow or deep burial of this waste, or other off-site waste disposal, long-term monitored storage

19

of the waste will be conducted at the Rocky Flats Plant until a disposal facility is approved. The Rocky Flats Plant shall notify the Director if long-term storage is the only waste management option for Rocky Flats mixed wastes. The Director's approval for this waste management option will be obtained PRIOR to exceeding approved permitted or interim status storage capacity for any waste type.

- (9) The approximate distances to various off-site treatment and disposal facilities are listed below.

APPROXIMATE ONE-WAY DISTANCES TO  
TREATMENT/DISPOSAL FACILITIES

Facility	Distance (miles)
OSCO, Henderson, Colorado	25
Hwy. 36 Landfill, Deer Trail, Colorado	50
USPCI, Green Mountain, Utah	614
USPCI, Lone Mountain, Oklahoma	581
Rollins Environmental Services, Deer Park, Texas	1,172
DOE Nevada Test Site, Nevada	986

- (10) All cleaning waters generated during closure decontamination activities that are compatible with the Rocky Flats Plant waste treatment facilities will be treated onsite. Wastes compatible with the Rocky Flats Plant waste treatment facilities currently include high and low pH solutions, radioactive solutions, and solutions contaminated with inorganics. Wastes that are reactive, ignitable, or contain high concentrations of organics are incompatible with the Rocky Flats Plant waste treatment facilities. It is currently anticipated that all cleaning wastes will be compatible with the Rocky Flats Plant waste treatment facilities. Pretreatment or post-treatment of wastes that are incompatible with the Rocky Flats Plant waste treatment system will be considered during preparation of the closure work packages.
- (11) Some aqueous wastes in the units may contain trace amounts of organics. Upon initiation of final closure, a wastewater pretreatment unit may be installed at the container area being closed or at Building 374 to remove

20

organics from wastewater. The following discussions assume any wastewater containing organics will be pretreated prior to its discharge into the Building 374 wastewater treatment system or treated for organics removal following treatment in Building 374. The types of waste generated during cleaning depend on the method used.

- (12) The volume of waste requiring ultimate treatment or disposal would include the maximum waste volume held in storage and the waste volume generated during the closure decontamination activities.
- (13) The waste volumes generated from closure decontamination activities for each unit are given in the subsections of this closure plan for individual units.
- (14) The volume of waste that will require off-site disposal upon closure is difficult to determine due to the large variety of wastes generated at Rocky Flats over time. However, a conservative estimate of this volume would be the total volume of waste on the plant site, as summarized above.

#### 10. Soil Sampling

- a. For the purposes of soil sampling, the units at the Rocky Flats Plant are divided into two groups. The first group consists of units located outdoors at which soil sampling will always occur during closure. The second group consists of units located indoors that could impact soils. Sections C., E., and G. of this plan identify those RCRA-regulated units that could potentially impact soils. These units were identified by their proximity to soils. Either floors are typically immediately above soils or a wall of the unit is immediately adjacent to soils. These units have not necessarily impacted soils, but data available on the unit will be evaluated at the time of closure to determine whether or not the potential exists for contamination of soil by a unit.
  - (1). Outdoor Units Undergoing Closure
    - (i) Soil Sampling
      - (a) The Rocky Flats Plant shall perform the soils screening for inorganic and organic contaminants and inspect for visual signs of contamination as specified in Appendix B - Soil Sampling, for outdoor units undergoing closure.
      - (b) The Rocky Flats Plant shall sample soils at units for contamination under the conditions specified in Appendix B - Soil Sampling.

- (c) The Rocky Flats Plant shall sample all outdoor asphalt storage pads for underlying and adjacent soil contamination. The Rocky Flats Plant shall core through the asphalt to obtain samples for those asphalt storage pads which the Rocky Flats Plant intends to leave in place after closure of the unit. Soil samples will be taken in accordance with the procedures specified in Appendix B.
- (d) Indicator parameters listed in Table 2 of Appendix B - Soil Sampling include specific hazardous and non-regulated constituents which may affect the Rocky Flats Plant's waste management options for contaminated soils.
- (e) Background levels of a contaminant in soil will be those obtained in soil sampling and analyses activities conducted under the Background Hydrogeological Characterization and Monitoring Plan being implemented at the Rocky Flats Plant and any additional background soil sampling programs approved by the Director.

(ii) Excavation of Soils

- (a) The Rocky Flats Plant shall perform the soil screening step and the verifying soil sampling, as detailed in Appendix B - Soil Sampling, to determine if the area under investigation is contaminated.
- (b) To determine the areal extent and depth of soil contamination, the Rocky Flats Plant shall repeat the steps above until the hazardous or mixed waste constituents in the area under investigation no longer exceed the closure performance standard.
- (c) The Rocky Flats Plant shall dispose of soils excavated during closure, that are not decontaminated, at an approved off-site facility in accordance with local, State, and Federal requirements.
- (d) If clean closure cannot be achieved, then post-closure activities will be implemented as described in Attachment 2 of the Environmental Restoration Inter Agency Agreement (IAG) executed on January 22, 1991.

(2). Indoor Units Undergoing Closure

- (i) Soil sampling related to indoor RCRA-regulated units will be handled in the following manner. If the unit is identified in Sections C., E., and G. as having a potential to impact soils, then soil sampling will be considered during the RCRA closure process. Soil sampling at those units which meet the conditions specified in Appendix B - Soil Sampling may be conducted when secondary

containment is decontaminated or found not to be decontaminatable. Soil samples will be taken in accordance with the procedures specified in Appendix B. If clean closure cannot be achieved, then post-closure activities will be implemented as described in Attachment 2 of the IAG.

#### 11. Criteria for Determining Post-Closure Care

- a. The criteria used to determine if a unit undergoing closure will be clean closed or follow post-closure procedures will be based upon the presence of groundwater contamination or under-building contamination caused by the unit. If groundwater or soils which have been contaminated by that RCRA unit are left in place, then the unit will be added to the list of potential areas of concern in the Historical Release Report. The unit will be investigated and remediated, if appropriate, through the process identified in the IAG. For clean closure, the unit will be cleaned to meet the applicable closure performance standards.
- b. The IAG process provides an orderly sequence of activities leading to site remediation. The stated intent of DOE is to completely remediate as many of the contaminated sites at the Rocky Flats Plant as possible, therefore no notice will be made in the deed to the facility property until the IAG process has been completed. At the point of completion of the IAG process, any required notifications will be made in compliance with 6 CCR 1007-3, Part 264.119 and Section 120(h) of CERCLA.

#### 12. Recordkeeping

The Rocky Flats Plant shall maintain the following closure records at the facility during closure activities and for a minimum of 30 years following closure of the facility.

- Record of sampling activities (date, number, and type)
- Results of screening activities, sampling of decontamination rinse waters, soil sampling, or groundwater sampling
- Actions taken to decontaminate or remove wastes structures, or soils, including contaminated soils
- Other documentation which verifies that the Rocky Flats Plant is following the approved closure plan.

#### 13. Amendment of Plan

- a. The closure plan will be amended whenever changes in operating plans or facility design affect the closure plan or a change of the expected year of closure occurs.

- b. In conducting partial or final closure, unexpected events which are identified during the implementation of required closure activities may also require an amendment of the existing closure plan. Soil sampling and analysis will be required at some of the units undergoing closure in order to evaluate the presence of soil contamination. Should soil sampling identify contaminated soils associated with an area undergoing closure, a request for modification of the closure plan will be submitted which includes a schedule for closure activities. The request for modification of the closure plan will be made within 30 days of identification of the event that causes modification of the closure plan to be necessary.
- c. Removal of wastes and decontamination or dismantling of equipment. Nothing in this section shall preclude the owner or operator from removing wastes and decontaminating or dismantling of equipment in accordance with the closure plan at any time before or after notification of partial or final closure of the facility.
- d. Disposal or decontamination of equipment, structures and soils. During closure activities, all contaminated equipment, structures and soils must be properly disposed of or decontaminated. By removing any hazardous wastes or hazardous constituents during closure activities, the owner or operator may become a generator of hazardous waste and must handle that waste in accordance with all applicable requirements of Part 262 of the Regulations.
- e. Removal or Replacement of Ancillary Equipment. Removal or replacement of equipment associated with hazardous waste management units can be accomplished as identified in c or d above without an amendment to the closure plan. Records of removal, decontamination or disposal actions will be maintained until closure of the hazardous waste management unit is accomplished.

24

## B. CONTAINER STORAGE AREAS - STANDARD CLOSURE ACTIVITIES

- a. Anticipated closure activities will be performed in a manner to achieve the objectives of the closure performance standards. A work package that includes the engineering information as well as health and safety protection information will be developed prior to closure of the unit. This work package will be developed in accordance with Rocky Flats Plant policies and procedures at the time of closure. At all times during closure activities, there will be strict adherence to all Rocky Flats Plant safety and security procedures which will be detailed in the work package.
- b. The closure of container storage areas will commence with the removal of inventory according to standard operating procedures. Inventory remaining in the area will enter into an appropriate process or recovery system, be transferred to another permitted container storage area, or be disposed of off site in accordance with Rocky Flats Plant procedures. At the time of closure, an evaluation will be made of the materials stored in the unit and may affect the decontamination solution used during closure. Initial sampling may be performed at the beginning of closure to determine if the unit needs to be decontaminated to meet the closure performance standard. If the unit meets the closure performance standard, as indicated by the results of initial sampling, the unit will be certified closed. Figure 4 presents a flow chart for container unit closure activities.
- c. Buildings
  1. Container storage areas which are buildings or tents are grouped in this category and can be closed according to the following procedures.
  2. Removal of the waste inventories will follow normal operating procedures for the units. Subsequent to the removal of inventory, samples may be taken of the walls, floor or secondary containment prior to decontamination. The results of the sample analysis will be used to determine subsequent steps in the closure procedure. If the results of the sampling do not indicate contamination wastes generated from sampling will be disposed of through standard Rocky Flats Plant procedures, and the unit will be certified closed. The amounts of solid and liquid wastes generated from closure would be minimal if this situation occurs.
  3. If catch basins or secondary containment structures used for containers with liquids are contaminated, they will be washed and rinsed. Samples will be collected from the rinsate as described in Appendix A - Decontamination. The washdown and rinsate solutions will be removed by a portable vacuum unit and placed in tanker trucks or in 55-gallon drums.
  4. If contaminated the interior walls of buildings or tents may be steam cleaned as described in Appendix A. The spent steam condensate will be sampled and analyzed

25

and results compared to the closure performance standard. The condensate will be removed by a portable vacuum unit and placed in tanker trucks or in 55-gallon drums.

5. After cleaning of the walls (if necessary), the floors in the building or tent will be cleaned, if contaminated, using the procedures described in Appendix A - Decontamination, with an appropriate cleaning solution from Table 2. The cleaning solutions, wash and rinsate will be collected with a vacuum unit. Cleaning solution will be generated at a rate of 50 gallons while completing a single wash and rinse cycle on 150 square feet of surface.
6. The cleaning agents and rinsate water will be collected and placed in 55-gallon drums or a tank truck. The effluent contained in the drums or tank will be sampled and analyzed and results compared to the closure performance standards. The rinsate will be transferred to Building 374 or 774 for treatment. Auxiliary equipment, such as drum hugger units or trucks used for loading drums, will be cleaned using steam cleaning methods in accordance with the methods outlined in Appendix A - Decontamination.
7. If parts of the floor cannot be decontaminated, the floor will be broken up and the contaminated parts, as well as drip pans which cannot be decontaminated, will be placed in containers for disposal at an approved off-site facility. In the event that all of the concrete cannot be fully and adequately decontaminated or removed, the unit will be certified closed, and post closure care or remediation will be initiated through the IAG process.
8. The empty drums, drum hugger, vacuum units, and tank trucks will be cleaned using a portable cleaning unit in accordance with the procedures described in Appendix A - Decontamination.
9. Screening of soil beneath and adjacent to this area will be done in accordance with Appendix B - Soil Sampling in order to confirm that no soil contamination is present.

26

C. CONTAINER STORAGE AREAS - UNIT-SPECIFIC CLOSURE INFORMATION

1. This section provides unit-specific information for each container storage unit subject to closure under this plan. Each unit to be closed is presented in a separate subsection that includes a general description and information on how the unit was historically used. Each subsection also includes an information sheet and a secondary containment drawing (if necessary).
2. Unit-specific closure information for hazardous waste container storage areas are provided in Table 2. This table provides estimates of the minimum and maximum time that will be required for closure activities and quantities of waste that will be generated during closure of each unit. The table also indicates which units are located in areas adjacent to soil, and, therefore, may require an investigation at the time of closure of potential soil contamination (see A.10.).
3. Table 2 provides estimates of the time required for closure and volumes of waste generated corresponding to the conceptual closure options discussed in Part A.9.e.
4. Time Requirements
  - a. Table 2 provides estimates of the time that will be required for closure activities for each unit including time for decontamination activities and for those activities that must be completed that are not directly associated with decontamination of the unit (e.g., engineering and equipment stripout). The estimated minimum and maximum times required for closure of each unit, or group of units, are based upon the procedures described in Section B. and the decontamination methods described in Appendix A.
  - b. The estimated minimum time required for closure represents those situations where sampling of the unit's secondary containment and/or associated equipment indicates that decontamination is not needed to achieve the closure performance standard. This estimate includes the time required to remove all of the unit's inventory, sample the unit's secondary containment and any equipment in the unit, obtain validated laboratory results for the sample analysis, and assess that the unit has been clean closed.
  - c. The estimated maximum time required for closure represents those situations where the initial sampling performed at a unit indicates that decontamination is necessary to achieve the closure performance standard. This estimate includes the time required to remove all of the unit's inventory, sample the unit's secondary containment, obtain validated laboratory results for those sample analyses, and the time required for the additional activities necessary for decontamination or disposal of the unit. These additional activities include stripout and disposal of equipment associated with the

27

unit, performance of decontamination, laboratory analysis of rinsate samples and validation of the results, and either certification of clean closure or notification of the need to initiate the appropriate post-closure process. The time required to decontaminate the secondary containment for each group of units is also shown on Table 2.

5. Decontamination Solution Volumes

The estimated minimum volume of decontamination solution generated results from the situation where sampling of the unit's secondary containment indicates that no decontamination is required to meet the closure performance standard. The estimated maximum volume occurs when sampling indicates that decontamination is required.

6. Solid Waste Volumes

As with the volumes of decontamination solution generated, the estimated minimum and maximum volumes of solid waste generated represent the cases where no decontamination is required and where decontamination is required, respectively. The minimum volume of solid waste is that which will be generated during sampling activities. This waste consists of personal protective equipment (PPE) used by sampling personnel and other solid waste generated such as filter papers and wipes. The maximum volume of solid waste generated is an estimate of the amount of solid waste generated by sampling activities and the performance of decontamination. If the unit also includes equipment and gloveboxes, the maximum estimated volume of solid waste also includes an estimate of the solid waste that will result if the equipment and gloveboxes can not be decontaminated to achieve the closure performance standard.

7. Need for Soil Investigation

Table 2 also indicates which units may require an investigation of potential soil contamination (see Section A.10.). This potential is indicated in cases where the secondary containment is adjacent to soil. The location of the secondary containment for these units indicates that the potential exists that hazardous constituents may have migrated to the soil beneath or adjacent to the unit.

28

## Unit 21 Building 788 Container Storage

Building 788 was used for pondcrete storage and repackaging. The building is a pre-engineered metal building with a concrete floor and a loading dock on the northwest end. Solid waste was stored on metal shelving units. Liquid waste was stored in drums within catch basins since the floor is not satisfactory for secondary containment. Repackaging operations were performed in a permacon structure within building. This structure is an enclosure inside the building used to minimize the spread of radioactive materials by controlling the building's air flow and restricting personnel into the area. A floor plan of the building showing dimensions and location of the permacon is found on drawing 39650-760.

Anticipated Closure Scenario: The closure option for this unit is expected to be partial closure of the facility (closure of a unit) and will follow the activities for closure of a container unit (Figure 4). A small amount of inventory remains and will be removed. Shelving units will be dismantled and also removed from the unit. All liquids were previously removed along with their secondary containment (catch basins). This unit primarily stored solids in triwall containers and plywood boxes. After all waste is removed the floor will be cleaned using a vacuum or similar equipment. At this point the unit is expected to be clean of RCRA constituents. The unit information sheet identifies EPA waste codes D002, D003, D006, D007, D008, D009, D018, D019, D028, D029, D035, D038, D040, D043, F001, F002, F003, F006, F007, F009 as potential hazardous waste constituents. A detailed sampling and analysis plan will be prepared to analyze for the presence of corrosivity, reactivity, cadmium, chromium, lead, mercury, benzene, carbon tetrachloride, trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, methylene chloride, xylene, ethylbenzene, cyanide, and nickel. The waste generated from closure activities is expected to be minimal and consist of laboratory samples. The closure schedule is anticipated to follow the minimum closure time schedule (Figure 1). After closure is certified, RFP plans to reuse this building on plantsite for other storage requirements.

219

## Container Storage Information Sheet

Unit Number: 21

Building: 788

Room: 100

Unit Type: Building

Unit Description: Pondcrete Storage Area

Waste Codes: D002, D003, D006, D007, D008, D009, D018, D019, D028, D029, D035, D038, D040, D043, F001, F002, F003, F006, F007, F009

Waste Descriptions: Liquid and Solid, Hazardous and Low-Level Mixed Waste

Maximum Capacity: 130,691 gal.

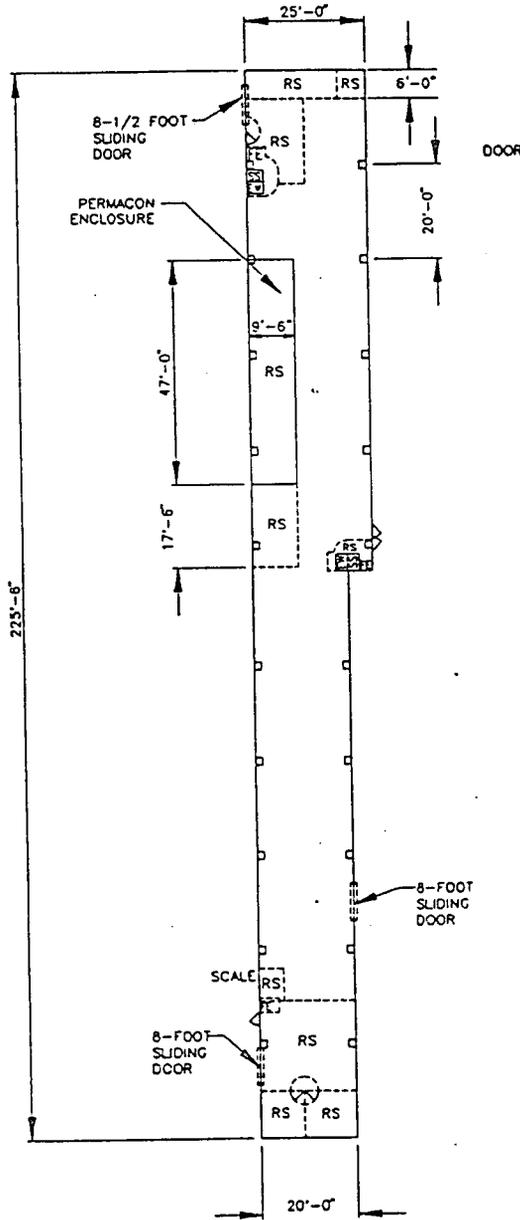
Secondary Containment:  
Type: Catch Basins

Drawing Number: 39650-760

Unit Specific Conditions: None

NOTES

1)



FLOOR AREA : 5037 sf

KEYWORDS	A	ORIGINAL ISSUE	XX/XX/93	JOH	TE	COH	DATE	RFP	DOE CLASS	JOB NO.
1. RCRA	PERM	DESCRIPTION								
2. CONTAINER	X	DESIGNED: HRANAC	12/29/93				U.S. DEPARTMENT OF ENERGY ROCKY FLATS AREA OFFICE GOLDEN, COLORADO			
3. STORAGE		DRAWN: KROHNER	12/29/93				Rocky Flats Plant			
4. WASTE		CHECKED: HICKS	12/29/93				GOLDEN, COLORADO 80401			
5. SECONDARY		APPROVED:					RCRA PERMIT MODIFICATION			
BLDG./FACILITY							CONTAINER STORAGE			
ROOM/AREA						UNIT ID 21				
ORD COOR./COL. NO.										
MASTER	SCALE:	SUBMITTED: BERBAUM	XX/XX/93	SIZE	DRAWING NUMBER	ISSUE	SHEET			
YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	NONE				B 39650-760	A				

"COMPUTER-GENERATED; NO MANUAL CHANGES ALLOWED"  
RCRA Closure Plan

3

**Table 2: Container Storage Area Unit-Specific Closure Information**

RCRA Unit ID	Building	Unit Type (See Note 1)	Room	Estimated Time Required for Closure (days)		Estimated Volume of Liquid Waste Generated (gallons)		Estimated Volume of Solid Waste Generated (cubic feet)		Potential Soil Investigation?
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
21	788	B		180	816	0	488990	8	19160	Yes

Note 1: C = Cargo Container, LOS = Outside Storage, IS = Indoor Storage, B = Building, G = Glovebox

32

#### D. TANK SYSTEMS - STANDARD CLOSURE ACTIVITIES

1. Actions for the closure of tank systems will be performed in a manner to achieve the objectives of the closure performance standard. All closure activities for tank systems will be implemented with consideration to the protection of human health and the environment as well as waste minimization. Prior to closure activities, an evaluation will be made to determine the units to be closed and their relationship to other units. The closure activities may vary if one tank unit is to be closed or if a process is to be discontinued prompting the closure of many interconnected units. Consideration will be given to the effect the closure of the unit or units will have on other systems or processes. After the determination is made of what units will be closed, a work package that includes engineering information as well as health and safety protection information will be developed. This work package may consist of separate documents detailing specific aspects of the project.
2. Included in a tank system are the tank and its ancillary equipment including dedicated piping, ports, pumps, filters, etc. The following paragraphs outline the general procedures necessary to successfully close the tank units in this permit. As an alternative, the tank units may be treated with an extraction or destruction BDAT specified under 40 CFR Section 268.45. Figure 6 presents a flow chart for tank system closure activities.
3. Removal of Inventory from Tanks
  - a. The closure of tank systems will commence with the removal of any remaining inventory. Inventory removal will be performed in accordance with Rocky Flats Plant standard operating procedures. The inventory of a mixed waste tank may be sampled and analyzed for plutonium content. A decision will be made to determine if the inventory will be processed for plutonium recovery or disposed of as a waste. For recovery, the inventory may be removed to a permitted storage unit prior to entry into a recovery system. If the determination is made to dispose of the inventory as waste and the concentration of plutonium exceeds the acceptable transfer limit for treatment in either Building 374 or Building 774, the contents will undergo a process such as precipitation, filtration or another appropriate process prior to removal from the tank. In-line filters may have recoverable amounts of plutonium and may be transferred to a recovery system. Solid waste generated from the process will be managed as part of the closure process.
  - b. The removal of inventory within the acceptable transfer limits for on-site treatment may be accomplished by pumping the tank contents into the process waste system for treatment in Building 374 or Building 774. If the plumbing is such that transfer into the process waste system cannot be done directly, the contents may be pumped into another tank system as a transfer point for entry into the process waste system. Alternatively, the tank contents may be pumped or drained into bottles prior to entry

into the process waste system, or a temporary plumbing system may be constructed to allow for direct connection into the process waste system. The upstream end of the tank (or of the farthest upstream tank if a series of tanks is being closed) will be blanked off or locked out to prevent additional liquid from entering the system being closed.

#### 4. Removal of Residual Material from the Tanks

Following removal of the tank inventory, an appropriate solution will be introduced to the tank to remove additional quantities of material. The removal of residual liquid may be accomplished through rinsing, sparging, or circulating the solution inside the tank. If the solution has concentrations of plutonium below the transfer limit for Building 374 or Building 774, it will be transferred to Building 374 or 774. If a series of tanks is being closed, solutions with plutonium concentrations below the transfer limit may be introduced into the next tank in the series for rinsing, sparging, or circulation to reduce the total amount of liquid waste generated. The process would continue until the plutonium concentration approaches the transfer limit at which time the liquid would be transferred to the waste treatment system, and a fresh solution would be introduced into the tanks. The process of rinsing, sparging, or circulating would continue until the final rinsate from each tank system is below the transfer limit.

#### 5. Decontamination and/or Removal

- a. Once the tank system has residual liquid and sludge removed, the tank system may be washed and rinsed using the appropriate method and solution identified in Appendix A. The rinsate will be analyzed for indicator parameters based on the hazardous waste constituents previously contained in the system. If the analysis indicates that the tank system meets the closure performance standard, the exterior of the tank system may be washed and rinsed and the rinsate will be analyzed for indicator parameters. The rinsate will be compared to the closure performance standard. Waste generated during closure will be disposed of properly. Management of the tank itself may include release of the tank to another use meeting the restrictions and requirements of DOE.
- b. If after washing and rinsing the tank system the closure performance standard is not met, procedures for either the removal or treatment of the tank and ancillary equipment will be considered for implementation. Closure activities will be performed in an exclusion zone that has restricted access to closure personnel or inside a temporary supplied breathing air house which may be constructed around the unit or units being closed in order to reduce the potential for the spread of contamination. The temporary structure would be constructed of a material conducive with the decontamination methods used on the tank system. It would also allow for

the safe use of mechanical cutting equipment, BDAT extraction or destruction equipment, or other similar equipment. The temporary structure would operate as a waste generation and storage area, in compliance with regulatory requirements for such an area. The storage area would be active only during closure activities. Prior to placement in a waste container, materials generated from within the structure would be considered "in process" and would not be a waste. Once waste materials are removed from the temporary structure, they would be managed in RCRA waste storage areas at the Rocky Flats Plant while awaiting off-site disposal. During this storage period, all applicable monitoring and inspection requirements would be met as identified in the standard operating procedures.

- c. The ancillary equipment will be dismantled, size-reduced as necessary, and disposed of properly. Some size reduction and packaging of the solid waste generated may take place in a size reduction vault, advanced size reduction facility, or other appropriate facility at the Rocky Flats Plant. Following the dismantling and removal of the ancillary equipment, the tank will be dismantled and appropriately size-reduced. Waste materials generated in the process will be packaged into suitable containers for disposal as described in A.9. Containers used for off-site disposal will be appropriate for the anticipated levels of radioactive contamination associated with the materials generated. Strippable decontamination coating and fixing agents may be utilized on the floor, walls, and ceiling of the temporary structure for contamination control. When no longer necessary for the reduction in the spread of contamination and the safety of the workers, the temporary structure will be decontaminated if possible or reduced onto itself and crated for solid waste disposal. If applicable the dismantled equipment will be treated using an extraction or destruction BDAT. If treatment is ruled out, the equipment will be disposed of in a manner meeting all Federal, State, and local requirements.
- d. Once the tank system is decontaminated and/or removed, the secondary containment and any auxiliary equipment dedicated to the unit, such as cabinets or tank stands, would be addressed. If the secondary containment is removable and not an integral part of the building structure (e.g., a stainless steel pan), it will be handled as though it were auxiliary equipment.
- e. Auxiliary equipment may be smear sampled as discussed in A.5. The samples will be analyzed for indicator hazardous waste constituents. If the smear sampling results do not indicate contamination, the auxiliary equipment will be considered to be free of hazardous waste constituent contamination. If the smear sampling does indicate contamination, the auxiliary equipment may be washed and rinsed with the appropriate decontamination method and solution as described in Appendix A. At any time during the procedure, rinsate will be collected and compared to the closure performance standard. If the closure performance standard is met, the auxiliary equipment will be

considered successfully decontaminated. If the closure performance standard is not met, the equipment will be size-reduced as appropriate and disposed of properly.

- f. Secondary containment that is an integral part of the building (e.g., a room with berms at doors), will be smear sampled. Areas that are identified as being contaminated will be decontaminated with regard to hazardous constituents using an appropriate solution and method as describe in Appendix A. At any time during the process, the rinsate will be analyzed for indicator parameters. If the closure performance standard is met, the equipment used for closure will be decontaminated and liquid and solid wastes generated from the procedure will be disposed of properly. If the closure performance standard is not met, a judgment may be made that the floor cannot be decontaminated, and the unit will enter post-closure care. The criteria for determining post-closure care is in A.11.
- g. The liquid waste generated from the decontamination of the secondary containment and auxiliary equipment will be handled appropriately through on-site treatment processes. Solid waste generated during the decontamination of secondary containment and auxiliary equipment will be packaged and disposed of properly in accordance with Rocky Flats Plant standard operating procedures.
- h. Once the interior and exterior of the tank system, all ancillary equipment, and secondary containment successfully meet the closure performance standard through decontamination, disposal, or treatment using BDAT the unit(s) will be certified closed.
- i. As an alternative to tank decontamination, any time during the closure process, a decision may be made to dismantle and dispose of the unit as an option to decontamination. The tank system will, however, be decontaminated at least to the level necessary to meet minimum health and safety requirements for worker protection.

## E. TANK SYSTEMS - UNIT-SPECIFIC CLOSURE INFORMATION

1. The tank system included in this closure plan is part of Unit 48, and is addressed with the rest of Unit 48 in Sections F. and G., Miscellaneous Treatment Units. The information provided in this section is applicable to closure of Unit 48.
2. Time Requirements
  - a. Table 3 provides time estimates required for closure activities for each unit, including time for decontamination and for those activities that are not directly associated with decontamination of the unit (e.g., engineering and equipment stripout). The estimated maximum and minimum times required for closure of each unit, or group of units, are based upon the procedures described in Section D. and the decontamination methods described in Appendix A.
  - b. The estimated minimum time required for closure represents those situations where sampling of the tank system and of the unit's secondary containment indicates that decontamination is not needed to achieve the closure performance standard. The estimated time for closure of each unit includes the time required to remove the unit's inventory, rinse the tank system and sample the rinsate, sample the exterior of the tank system, obtain validated laboratory results for the samples, and certify the unit as clean closed. For units that do not share secondary containment with other units and for the group total for units that share secondary containment, this estimate also includes the time required to sample secondary containment. As is reflected in Table 3, the minimum time required to close a unit is not dependent upon whether or not secondary containment is being addressed at the time the unit is being closed since no decontamination of the secondary containment would be needed under the minimum time scenario.
  - c. The estimated maximum time required for closure of each unit represents those situations where the initial sampling performed at a unit indicates that decontamination is necessary to achieve the closure performance standard. This estimate includes the time required to remove the unit's inventory, rinse the tank system and sample the rinsate, sample the exterior of the tank system, and obtain validated laboratory results for the samples, and the time required for additional activities required for decontamination of the unit. These additional activities include performance of the necessary engineering, stripout of tank systems, performance of decontamination, laboratory analysis of rinsate samples and validation of the results, and either certification of clean closure or notification of the need to initiate the appropriate post-closure process. As with the minimum time required for closure, sampling and decontamination of secondary containment are not included in the estimates for individual units sharing secondary containment but are included in the estimates for units that do not share secondary containment and in the group totals for units sharing

secondary containment. The time required to decontaminate the secondary containment for each group of units is also shown on Table 3.

#### 4. Decontamination Solution Volumes

- a. The minimum volume of decontamination solution is generated under the following conditions:
- Rinsing of the tank system interior is performed and rinsate samples demonstrate that the closure performance standard has been achieved. Therefore, no further decontamination of the interior of the tank system is required.
  - The tank system exterior is smear sampled and determined to meet the closure performance standard; therefore, it does not require decontamination.
  - For tank systems that do not share secondary containment with other tank systems, when all tanks that share an area of secondary containment are closed simultaneously, or when the tank being closed is the last to close in an area of shared secondary containment, the secondary containment is sampled and determined to meet the closure performance standard. Therefore, it does not require decontamination. As discussed above, when tank systems that share secondary containment are closed independently of the other tank systems using that area of secondary containment, the secondary containment will not be sampled or decontaminated at the time the individual tank system is closed.
  - Therefore, the minimum volume of decontamination solution generated consists only of that solution generated by internal rinsing of the tank system.
- b. The maximum volume of decontamination solution occurs when the following conditions exist:
- Initial sampling of the tank system indicates that decontamination of the tank system interior is necessary to meet the closure performance standard.
  - The tank system exterior is smear sampled, determined to be contaminated at levels above the closure performance standard, and therefore requires decontamination.
  - For tank systems that do not share secondary containment with other tank systems, when all tanks that share an area of secondary containment are closed simultaneously, or when the tank being closed is the last tank to close in an area of shared secondary containment, the secondary containment is sampled,

B8

determined to not meet the closure performance standard, and therefore requires decontamination.

5. Solid Waste Volumes

- a. The minimum volume of solid waste is generated under the same conditions that generate the minimum volume of decontamination solution. This waste consists of the solid waste generated during rinsing of the tank system interior and obtaining rinsate samples, and during sampling of the tank system exterior and, when appropriate, the secondary containment. The volume of waste generated during these activities consists of PPE, temporary containment, and other solid waste. As is reflected in Table 3, the volume of solid waste generated during sampling of the secondary containment is negligible in comparison to that generated during sampling of the tank systems.
- b. Maximum volumes of solid waste result from the same conditions that generate the maximum volume of decontamination solution. In addition to the waste generated during sampling and the performance of decontamination of the tank system interior and exterior and, when appropriate, the secondary containment, this volume also includes the tank system itself. This represents the instance when decontamination of the tank system does not achieve the closure performance standard and the tank system is size-reduced and disposed of.

6. Need for Soil Investigation

- a. Table 3 also indicates which units may require an investigation of potential soil contamination (see A.10.). This potential is indicated in cases where the secondary containment is located adjacent to soil. The location of the secondary containment for these units indicates that the potential exists that hazardous constituents may have migrated to the soil beneath the room.

F. MISCELLANEOUS TREATMENT UNITS - STANDARD CLOSURE ACTIVITIES

Closure procedures for miscellaneous treatment units will follow those described in Sections B, Container Storage Areas - Standard Closure Activities and D, Tank Systems - Standard Closure Activities. Figure 7 presents a flow chart for closure activities. Section G, Miscellaneous Treatment Units - Unit-Specific Closure Information provides unit-specific decontamination information for the treatment units in this plan.

G. MISCELLANEOUS TREATMENT UNITS - UNIT-SPECIFIC CLOSURE INFORMATION

1. This section provides unit specific information for each treatment unit subject to closure under this plan. Each unit to be closed is presented in a separate subsection that includes a general description and information on how the unit was historically used. Each subsection also includes an information sheet, a simplified P&ID (if necessary) and a secondary containment drawing (if necessary).
2. Unit-specific closure information for miscellaneous treatment units is provided in Table 4. The basis for the information provided in this table is the same as that discussed in Sections C. for containers and E. for tank systems.

## UNIT 48 Pondcrete Solidification Process

Building 788 is a support facility for pondcrete processing and repackaging, and storing low-level mixed waste. Unit 48, the pondcrete solidification equipment, is located outside on the east and northwest side of Building 788. Equipment used in the process included an open top clarifier tank with a cone bottom, a pug mill, cement mixer, morgan pump, and pumps and piping used to transfer material from the ponds to the clarifier and from the clarifier to the pug mill and cement mixer and morgan pump. The clarifier tank is mounted above ground and the area below the clarifier tank is enclosed with plywood and heated to protect the piping, valves and air compressor from the environment. The pug mill is mounted above ground and is located approximately thirty feet south of the clarifier. The cement mixer and morgan pump are mounted on stands on the northwest side of Building 788.

Sludge from solar evaporation ponds 207A, 207B, (North, Center, and South) and 207C was processed to produce a solid waste called pondcrete. Pond water and sludge were pumped into the clarifier tank. The solids were allowed to settle and excess pond water was returned to the solar ponds. Sludge was then pumped from the clarifier to the pug mill or cement mixer where it was mixed with Portland cement and drained into triwall or plywood boxes. Full boxes were moved away from the area and allowed to cure.

A simplified P&ID (Drawing No. 39650-3085) and unit specific information follow. Secondary containment for the unit is provided by an asphalt pad with drainage into the solar pond. The secondary containment is part of operable unit 4 that is to be closed under the Inter-Agency Agreement (IAG) and is not part of this closure plan.

Anticipated Closure Scenario: The closure option for this unit is expected to be partial closure of the facility (closure of a unit) and will follow the activities for closure of a treatment unit (Figure 7).

Clarifier and Ancillary Equipment: Remove sludge and decontaminate using high pressure steam or water. A decontamination solution will be selected (Table 2 Appendix A) and will be flushed through the ancillary pipes and pumps. Rinsate samples will be taken and compared to the closure performance standard. The unit information sheet identifies EPA waste codes F001, F002, F003, F005, F006, F007, F009 and D006 as potential hazardous waste constituents. The rinsate will be analyzed for carbon tetrachloride cyanide, ethyl benzene, methylene chloride, tetrachloroethylene, toluene, trichloroethylene, 1,1,1-trichloroethane, xylene, and cadmium (the selected indicator parameters from Table 1A). After the interior of the clarifier is cleaned, the exterior will be decontaminated and sampled for the same parameters. The volume of waste generated will depend on the extent of decontamination conducted, and an estimate is given in Table 4. The liquid/sludge will be deposited in the Solar Pond Sludge Storage Tanks (750 pad).

Pug Mill, Cement Mixer, and Morgan Pump: It is anticipated that this equipment will meet the closure performance standard; therefore, direct samples will be taken and analyzed and compared to the Closure Performance Standard for the constituents identified above.

The time required for closure will follow the closure schedule shown in Figure 2, and may be as long as the maximum time indicated in Table 4.

After the above activities have been completed, the unit is expected to be certified clean-closed.

The secondary containment for the unit is provided by a concrete and asphalt pad with drainage into the solar pond. The secondary containment is part of operable unit 4 that is to be closed under the IAG and is not addressed in this closure plan.

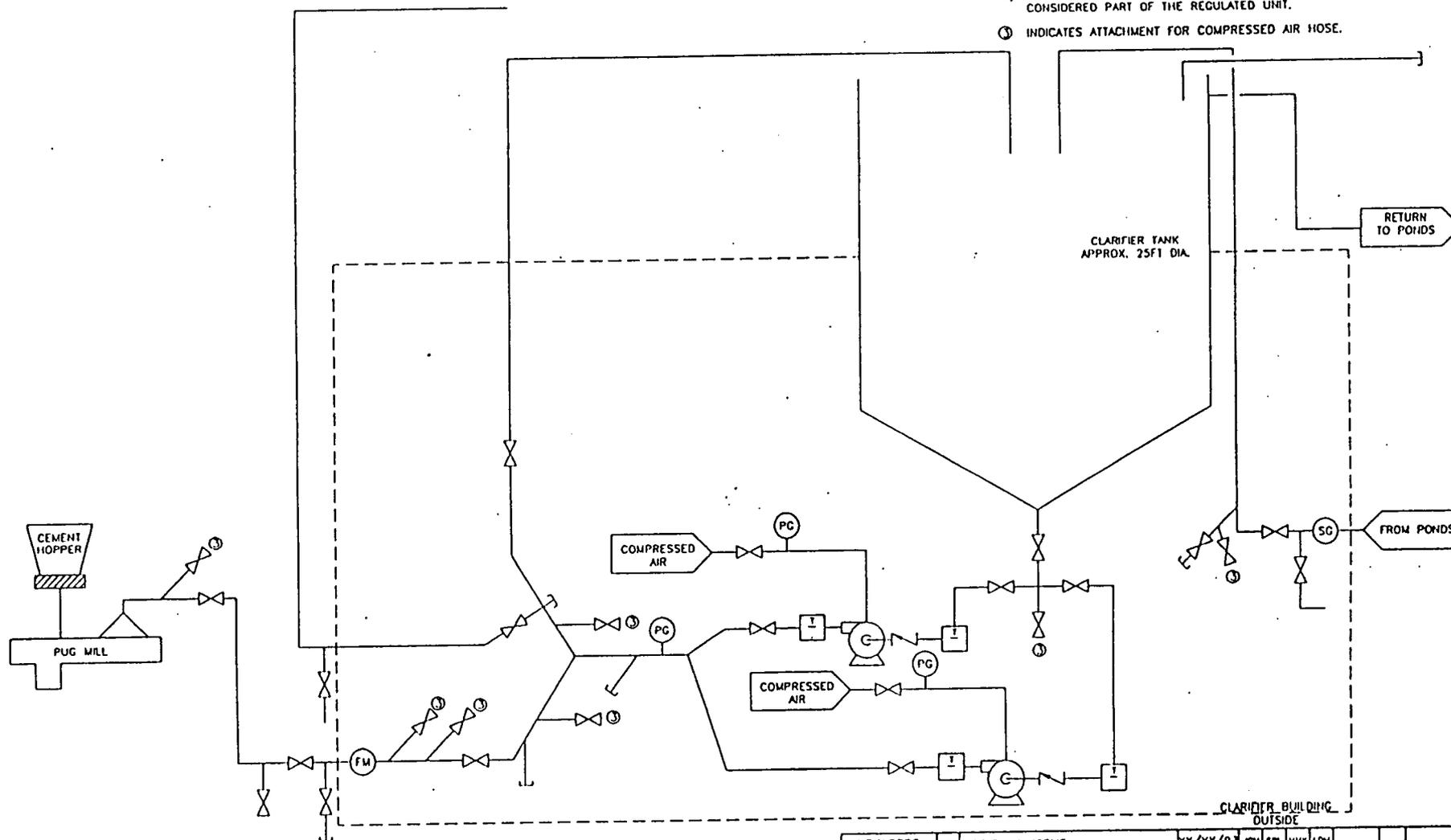
## Treatment Unit Information Sheet

**Unit Number:** 48  
**Building:** 788  
**Room:** Outside, East side of building  
**Treatment Unit Description:** Pondcrete solidification process  
**Design Capacity:** TBD  
**Type:** Solidification Unit  
**Dimensions:** Clarifier: Approximately 25' D x 10' T-T  
**Waste Codes:** F001, F002, F003, F005, F006, F007, F009, D006  
**Waste Descriptions:** Solid and liquid low-level mixed waste  
**Secondary Containment:**  
**Type:** See Unit Specific Conditions  
**Drawing Number:** None  
**PFD Drawing Number:** 39650-3085  
**Unit Specific Conditions:** Secondary containment for the unit is provided by a concrete and asphalt pad with drainage into the solar pond. The secondary containment is part of another unit that is to be closed under the IAG and is not shown in the Closure Plan.

PONCRETE SOLIDIFICATION  
UNIT # 48

NOTES

- 1) THIS SIMPLIFIED SCHEMATIC IS NOT AN AS-BUILT REPRESENTATION OF THE SYSTEM.
- 2) EQUIPMENT AND MATERIAL SHOWN IN ARROW BOXES ARE NOT CONSIDERED PART OF THE REGULATED UNIT.
- 3) INDICATES ATTACHMENT FOR COMPRESSED AIR HOSE.



KEYWORDS	A	ORIGINAL ISSUE	DATE	XX/XX/93	REV	BY	CHK	SR	CHK	DATE	DOC	CLASS	JOB NO.
1. RCRA	ISSUE	DESCRIPTION											
2. CLOSURE		DESIGNED	IRANAC	XX/XX/93							U.S. DEPARTMENT OF ENERGY ROCKY PLATS AREA OFFICE GOLDEN, COLORADO		
3. PLAN		DRAWN	LEINIE	XX/XX/93							Rocky Plate Plant		
4. P&ID		CHECKED	KELLER	XX/XX/93							GOLDEN, COLORADO 80401		
5.		APPROVED	MCMAHANS	XX/XX/93							RCRA CLOSURE PLAN		
BLDG/FACILITY											PONCRETE SOLIDIFICATION UNIT 48		
ROOM/AREA											DRAWING NUMBER		
CLARIFIER UNIT											ISSUE		
CAD COOR/CO. NO.											SHEET		
MASTER		SCALE	BIRBAUM	XX/XX/93	SIZE	B39650-3085			ISSUE	A			
YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		AS NOTED											

"COMPUTER-GENERATED: NO MANUAL CHANGES ALLOWED"

RCRA Closure Plan  
Draft 2/4/94 Rev. 1

41

45

788  
CL UN  
A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P  
Q  
R  
S  
T  
U  
V  
W  
X  
Y  
Z

**Table 4: Treatment Unit  
Unit-Specific Closure Information**

RCRA Unit ID	Building	Estimated Time Required for Closure (days)		Estimated Volume of Liquid Waste Generated (gallons)		Estimated Volume of Solid Waste Generated (cubic feet)		Potential Soil Investigation?
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
48 (note 1)	788	180	816	7360	95695	14	2035	N/A

*Note 1: This unit shares secondary containment with another unit that is to be closed under the Interagency Agreement.*

46

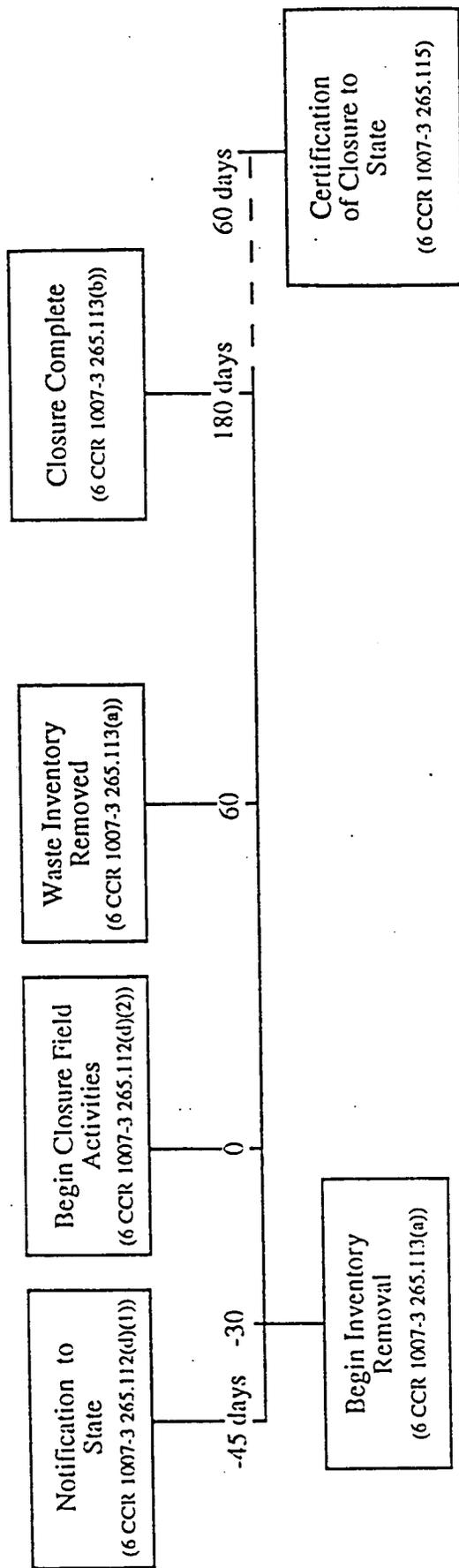
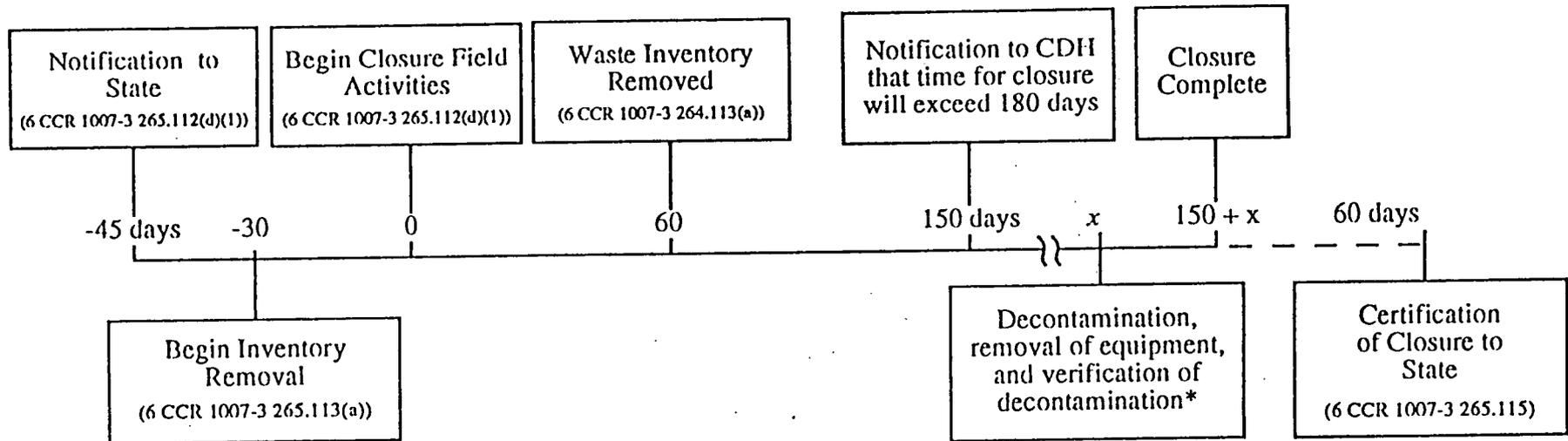


FIGURE 1  
MINIMUM CLOSURE TIME



\*See Tables 2, 3, 4, or 5 of this Plan for the value of x for each unit.  
 x = Maximum Time for Closure

FIGURE 2  
 MAXIMUM CLOSURE TIME

Closure of Unit

Partial Closure of Unit

Shared Secondary Containment

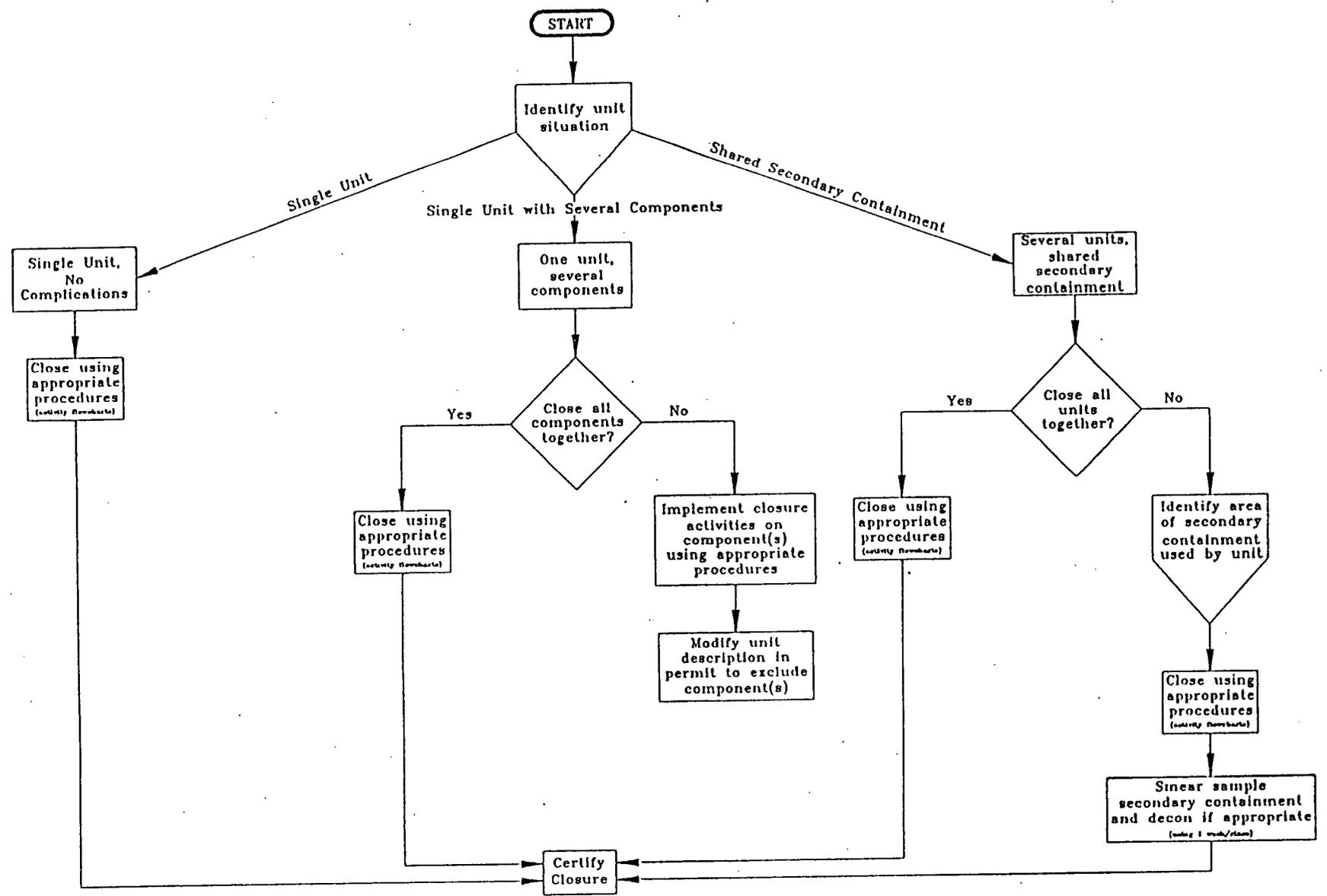


FIGURE 3  
CLOSURE OPTIONS

45

RCRA Closure Plan  
Draft 2/4/94 Rev. 1

49

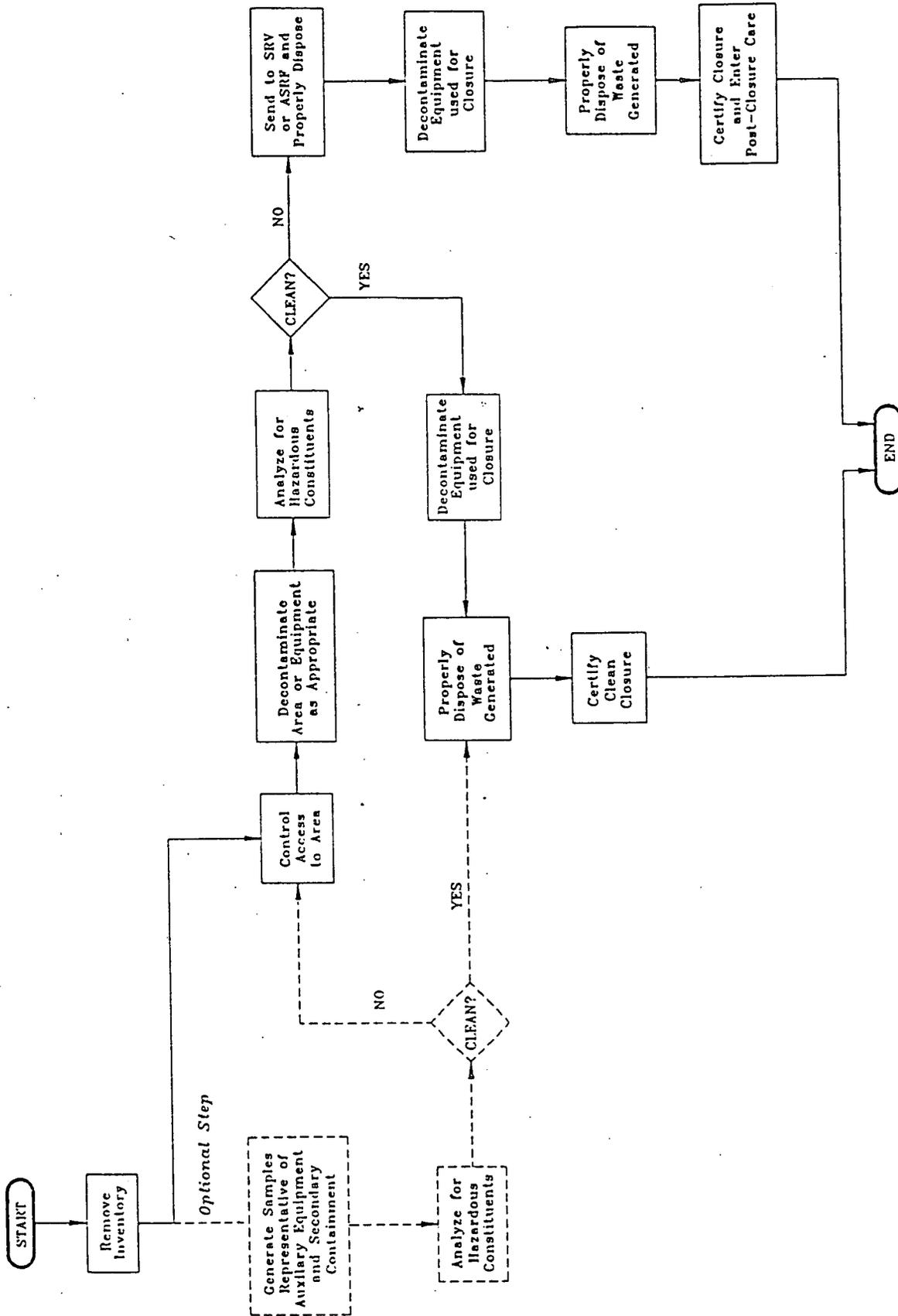


FIGURE 4  
 Container Unit  
 CLOSURE ACTIVITIES

Note:  
 At any time during closure, a decision can be made to dispose of equipment and materials as an option to decontaminating, but the equipment and materials must be handled properly, based on characteristics.



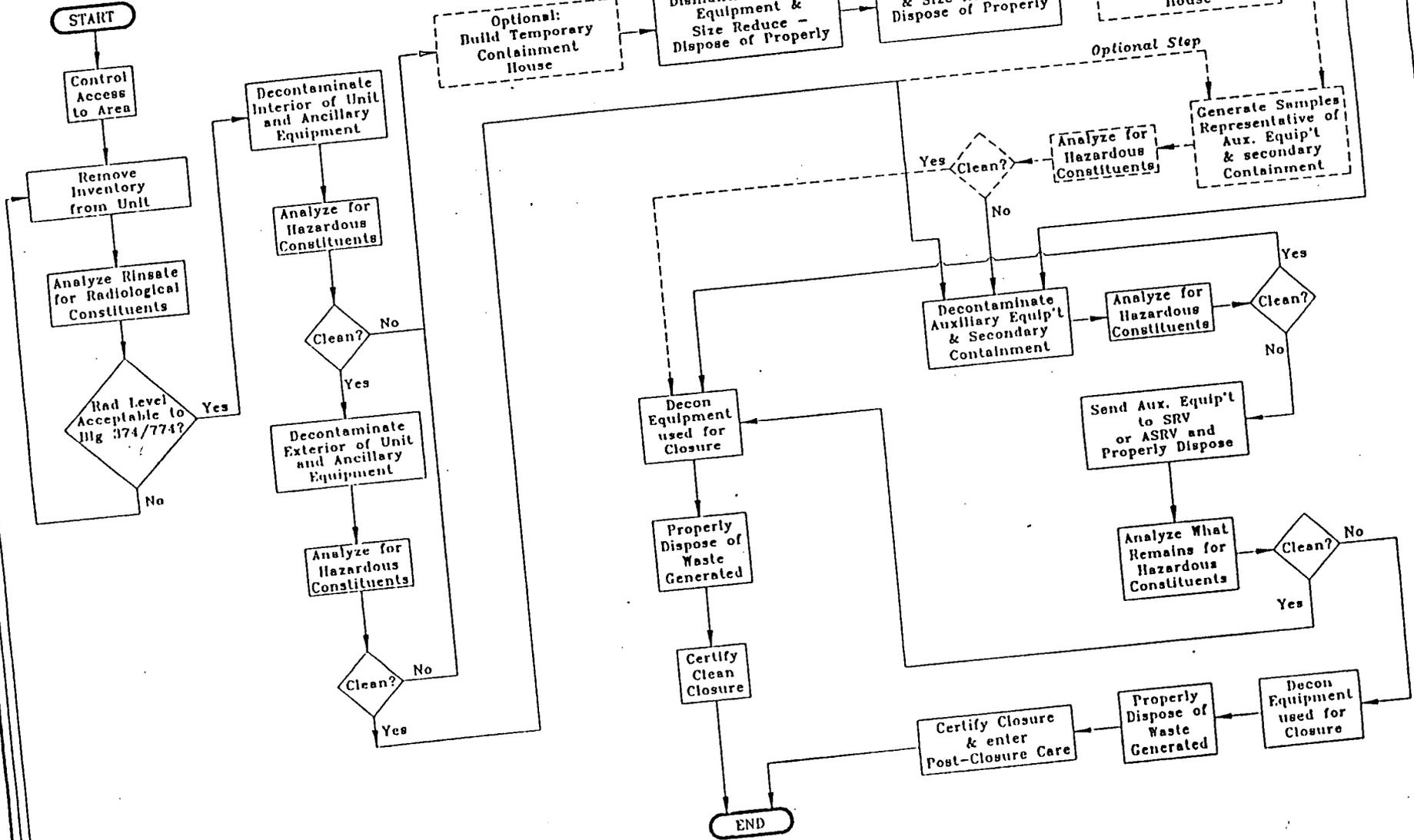


FIGURE 7  
Treatment Unit  
CLOSURE ACTIVITIES

Note:  
At any time during closure, a decision can be made to dispose of equipment and materials as an option to decontaminating, but the equipment and materials must be handled properly, based on characteristics.

APPENDIX A

*Appendix A will be a copy of Part IX of the RCRA Permit - Decontamination Procedures.*

APPENDIX B

*Appendix B will be a copy of Part X of the RCRA Permit - Soil Sampling.*

34/54